This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

   More than 10 units from the number 3.

   The solution is $(-\infty, -7) \cup (13, \infty)$, which is option C.

   A. $[-7, 13]$

   This describes the values no more than 10 from 3

   B. $(-\infty, -7] \cup [13, \infty)$

   This describes the values no less than 10 from 3

   C. $(-\infty, -7) \cup (13, \infty)$

   This describes the values more than 10 from 3

   D. $(-7, 13)$

   This describes the values less than 10 from 3

   E. None of the above

   You likely thought the values in the interval were not correct.

   General Comment: When thinking about this language, it helps to draw a number line and try points.

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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-9x + 5 \leq 5x + 4$$

   The solution is $[0.071, \infty)$, which is option B.

   A. $(-\infty, a]$, where $a \in [-0.63, 0.04]$

   $(-\infty, -0.071]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

   B. $[a, \infty)$, where $a \in [0.03, 0.34]$

   * $[0.071, \infty)$, which is the correct option.

   C. $[a, \infty)$, where $a \in [-0.29, -0.03]$

   $[-0.071, \infty)$, which corresponds to negating the endpoint of the solution.

   D. $(-\infty, a]$, where $a \in [0.05, 0.16]$

   $(-\infty, 0.071]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-9 + 4x < \frac{37x - 8}{8} \leq -7 + 3x$$

The solution is None of the above., which is option E.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [8.25, 14.25]$ and $b \in [2.25, 8.25]$

$(-\infty, 12.80] \cup (3.69, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

B. $(a, b]$, where $a \in [8.25, 17.25]$ and $b \in [3, 5.25]$

$(12.80, 3.69]$, which is the correct interval but negatives of the actual endpoints.

C. $[a, b)$, where $a \in [9.75, 15]$ and $b \in [2.25, 4.5]$

$[12.80, 3.69)$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [11.25, 14.25]$ and $b \in [-1.5, 7.5]$

$(-\infty, 12.80) \cup [3.69, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $(-12.80, -3.69]$.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7 + 7x > 9x \text{ or } 9 + 3x < 4x$$

The solution is $(-\infty, -3.5)$ or $(9.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-10.5, -6]$ and $b \in [2.25, 7.5]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.5, 0]$ and $b \in [8.25, 9.75]$

Corresponds to including the endpoints (when they should be excluded).

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-6.75, -3]$ and $b \in [8.25, 10.5]$

* Correct option.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-13.5, -7.5]$ and $b \in [0, 4.5]$

Corresponds to inverting the inequality and negating the solution.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-7}{2} - \frac{9}{8}x \leq \frac{5}{9}x - \frac{4}{5}$$

The solution is $[-1.607, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [-4.5, 0.75]$

* $[-1.607, \infty)$, which is the correct option.

B. $(-\infty, a]$, where $a \in [0.75, 5.25]$

$(-\infty, 1.607]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

C. $[a, \infty)$, where $a \in [-1.5, 3]$

$[1.607, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [-6, -0.75]$

$(-\infty, -1.607]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-8}{7} + \frac{6}{2}x > \frac{7}{9}x + \frac{7}{5}$$

The solution is $(1.144, \infty)$, which is option A.

A. (a, ∞), where $a \in [0, 4.5]$

* $(1.144, \infty)$, which is the correct option.

B. $(-\infty, a)$, where $a \in [-0.75, 4.5]$

$(-\infty, 1.144)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. (a, ∞), where $a \in [-3, -0.75]$

$(-1.144, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a)$, where $a \in [-4.5, 0]$

$(-\infty, -1.144)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 + 6x > 8x \text{ or } 6 + 9x < 10x$$

The solution is $(-\infty, -2.0)$ or $(6.0, \infty)$, which is option B.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.5, 2.25]$ and $b \in [5.25, 12]$

Corresponds to including the endpoints (when they should be excluded).

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4.5, -0.75]$ and $b \in [3.75, 9]$

* Correct option.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-9.75, -5.25]$ and $b \in [0.75, 2.25]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-8.25, -3.75]$ and $b \in [0, 2.25]$

Corresponds to including the endpoints AND negating.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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8. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No less than 6 units from the number 5.

The solution is None of the above, which is option E.

A. $[1, 11]$

This describes the values no more than 5 from 6

B. $(-\infty, 1] \cup [11, \infty)$

This describes the values no less than 5 from 6

C. $(1, 11)$

This describes the values less than 5 from 6

D. $(-\infty, 1) \cup (11, \infty)$

This describes the values more than 5 from 6

E. None of the above

Options A-D described the values [more/less than] 5 units from 6, which is the reverse of what the question asked.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 + 5x \leq \frac{25x - 8}{4} < 6 + 4x$$

The solution is $[-1.60, 3.56)$, which is option A.

A. $[a, b)$, where $a \in [-2.4, -1.05]$ and $b \in [0, 6]$

$[-1.60, 3.56)$, which is the correct option.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [-2.25, 1.5]$ and $b \in [-1.5, 6]$

$(-\infty, -1.60) \cup [3.56, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $(a, b]$, where $a \in [-2.25, -0.75]$ and $b \in [0, 4.5]$

$(-1.60, 3.56]$, which corresponds to flipping the inequality.

D. $(-\infty, a] \cup (b, \infty)$, where $a \in [-5.25, 0]$ and $b \in [1.5, 8.25]$

$(-\infty, -1.60] \cup (3.56, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$3x + 8 \geq 5x - 10$$

The solution is $(-\infty, 9.0]$, which is option B.

A. $[a, \infty)$, where $a \in [9, 13]$

$[9.0, \infty)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

B. $(-\infty, a]$, where $a \in [6, 10]$

* $(-\infty, 9.0]$, which is the correct option.

C. $(-\infty, a]$, where $a \in [-9, -3]$

$(-\infty, -9.0]$, which corresponds to negating the endpoint of the solution.

D. $[a, \infty)$, where $a \in [-9, -7]$

$[-9.0, \infty)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.